

# **Mountaintop Mining/Valley Fill Environmental Impact Statement Technical Study**

## **WORK PLAN APPROACH FOR SOIL QUALITY AND FOREST PRODUCTIVITY**

August 9, 1999

### **I. Problem Statement**

A typical mountain-top mining/valley fill (MTM/VF) operation in the Appalachian coalfields removes overburden and interburden material to facilitate the extraction of low-sulfur coal seams, and requires the placement of excess spoil into valleys containing first and second order streams. The removal of trees and the replacement of topsoil or use of topsoil substitutes leads to impacts on soil quality and forest productivity that has been documented by researchers over the past several decades.

The EIS will evaluate State and Federal regulations, policies, and practices; relevant literature; and soil conditions of existing reclaimed lands to assess the effectiveness of current reclamation practices on reclaimed forest lands. The study will incorporate:

- S discussions with State/Federal inspection, enforcement, and permit review personnel and Federal reclamation experts;
- S reviews of permits, inspection reports and other relevant documents;
- S results of research reports;
- S findings of university researchers; and,
- S results of site investigations

The EIS Soil Quality and Forest Productivity Team will evaluate the adequacy of current reclamation techniques and recommend improvements where appropriate. This work plan will augment the activities of the **Terrestrial Habitat** team, whose work is described in a separate plan.

### **II. Goals and Questions to be Addressed by This Work Plan**

The steering committee for the Environmental Impact Statement (EIS) has adopted goals and questions to be addressed from several different perspectives: environmental, regulatory, and public service. This work plan, in conjunction with the other work plans and technical symposia that will be conducted during the preparation of the EIS, will attempt to address the following goals as adopted by the committee:

- ! What are the most appropriate qualitative and quantitative measures of effectiveness of forest/habitat impact and restoration?
- ! How are forest reclamation practices evaluated and improved so that forest

fragmentation and habitat disruption are considered?

- ! If there are competing uses for mined land, what are the key indicators from an environmental standpoint for determining which areas can be developed (e.g., farming, sport hunting habitat, commercial forestry, development) and which areas should be returned to their pre-mining state (e.g., characteristic mixed hardwood forest)?

### **III. EIS Team Members and Experts Consulted**

Point of Contact: Milton Allen, OSM Appalachian Regional Coordinating Center, Pittsburgh, PA, (412) 937-2863, [mallen@osmre.gov](mailto:mallen@osmre.gov)

OSM London, KY Area Office: Pat Angel

OSM Madisonville, KY Area Office: Mike Vaughn

OSM Mid-Continent Regional Coordinating Center: Ervin Barchenger

OSM Headquarters: Scott Boyce

#### Experts Consulted:

University of Kentucky: Don Graves

WVDEP: John Ailes

VPI: Jim Burger

West Virginia: Bill Plass

OSM: Kim Vories, Bob Postle, Dennis Rice

### **IV. Evaluation of Current Practices**

*Study Approach*: The Surface Mining Control and Reclamation Act (SMCRA) led to regulations containing permitting, design, and construction monitoring requirements to implement state-of-the-art engineering and reclamation standards for surface-mined lands. The regulations and performance standards were tailored to ensure meeting the SMCRA goals for returning mined lands to pre-mining productive capability. This study will focus on the soil characteristics needed to ensure long-term forest productivity on reclaimed mined lands.

It is impractical for this evaluation to definitively confirm that all surface mined lands throughout the Appalachian region have been restored to their pre-mining forest capability (if forest land was the pre-mining state). The mere fact that it takes more than 50 years to produce a site index that would show the land's capability for forest production makes that task almost impossible. Therefore, this evaluation focuses on issues which are indirect or direct indicators of regulatory program effectiveness in assuring long-term soil quality and forest productivity on reclaimed mine sites.

The EIS team will perform the following tasks to establish the effectiveness of regulatory programs with respect to soil quality and forest productivity:

1. Assemble all available literature on soil quality and forest productivity evaluations and compare the conclusions and recommendations with known current practices. Assemble and review government reports, contract studies, and other technical reviews pertaining to the construction of mine soils. Include National Academy of Science reports, contract research studies, oversight special studies, reports of investigation on specific fill problems, professional articles, regulation preambles, public hearing transcripts, court decisions, letters, memoranda, etc. The review will assess current Federal and State regulations as well as historic and current regulatory program policies and inspection practices. Develop an accounting of program-related problems and issues affecting soil reconstruction and an historical perspective of the technical issues at hand. Compare issues and recommendations in the reports to current day issues and practices for relevance. This information will be used to help data collection efforts for some of the other tasks outlined below.
2. Examine soil properties to determine the effect different factors have on the productivity of reclaimed mined lands. Determine productivity of reclaimed mine soils with respect to suitability for plant growth. Since the primary vegetation on these mountain top removal sites is a hardwood mix forest, particular interest will be paid to the re-establishment of a productive forest. Reliable methods for evaluating long-term productivity over the short run are needed to evaluate the success of mine reclamation programs. Researchers have been sampling mined and unmined soil to assess soil productivity factors. The study will review all available data, such as soil texture, particle size, organic matter content, pH, cation exchange capacity, available water holding capacity and available mineral nutrient content to determine soil productivity. Soil productivity cannot be determined from soil factors alone; however, they are good indicators of potential productivity. Experts will also be asked to comment on other factors that may good indicators of restored soil productivity.
3. Evaluate the effectiveness of current sampling and testing protocols for establishing procedures to evaluate factors such as soil compaction and living matter in reclaimed soils.
4. Establish the effectiveness of current methods used in inspection and enforcement assess proper restoration of mined soil.
5. Evaluate long-term indices for determining forest productivity on reclaimed mined lands.
6. Interview prominent researchers currently working on soil reconstruction and forest

establishment on mined lands, do literature searches for existing information, and conduct field evaluations to compare and verify information. Scientists identified for interviews and acquisition of pertinent documents are: Don Graves from Kentucky, Bill Plass from West Virginia, James Burger from Virginia, and Willis Vogel, retired Forest Service employee . The Team will evaluate and compile information obtained from the literature search and from the interviews to determine how to design any field study that may be necessary. Recognizing the complexity of this issue, the study will systematically gather data for inclusion in the overall work plan product.

7. Review regulations to determine the effects SMCRA is having on forest productivity of reclaimed lands.
8. Determine, from interviews with researchers, which factors (i.e., seed quality, tree handling, soil chemistry, species tolerance, aeration, texture, coarse fragments, and soil compaction) or combination of factors limit tree production on mined lands.
9. Conduct field verification of site conditions where the researchers want to show team members physical evidence of things they described during the interview.

*Final Report:* The Team will prepare a chapter that can be included into the report of investigation for the entire EIS project. This chapter will provide:

- C a comprehensive analysis of the technical and programmatic issues identified
- C the results of the field inspections and testing
- C general conclusions, where they can be reached, on the long-term stability of the fills

## **V. Projected Study Costs:**

The only cost associated with this work plan is related to the time and travel for the team operation. OSM is covering those costs.

For further information regarding this work plan, please contact Dr. Milton Allen at (412) 937-2863, or at [mallen@osmre.gov](mailto:mallen@osmre.gov).